

What Is Claimed Is:

1. A button-type device for three-dimensional rotation or translation control, in which an application program runs to rotate and to translate a predetermined three-dimensional object on a display screen, the button-type device comprising:
- 5       a) a button-part including 9 buttons of a 3x3 array and having combinations of buttons on horizontal, vertical, and diagonal lines, corresponding to the direction of rotation or translation of a three-dimensional object on the three-dimensional axis of rotation or along the axis of translation; and
- 10       b) a microcomputer for recognizing the depressed combination of buttons, the order of the button depressed, and the key-depressing time and outputting a control signal so as to rotate or to translate a portion of or whole configuration of the three-dimensional object on the display screen.
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2. A device according to claim 1, wherein the three-dimensional object is a cube box having a whole configuration of a cube.
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3. A device according to claim 2, wherein the axes of the three-dimensional object comprise:
- 25       a) an X axis, a Y axis, and a Z axis;
- b) a HH axis which exists on a same plane of the X and the Y axis at an angle of 45 degrees from the -X and the Y axis; and
- c) 4 diagonal axes which link a vertex of each regular square, which composes a unit surface of a solid cube, to a vertex of an opposite side by way of a center of mass.
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4. A device according to claim 3, further comprising a memory which stores a unit angle of rotation of the predetermined three-dimensional object.

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5. A device according to claim 4, wherein the microcomputer determines the direction of rotation of the three-dimensional object, either clockwise rotation or counterclockwise rotation, according to the order of buttons depressed by means of the button-part, and the angle of rotation according to the unit angle of rotation stored in the memory.

6. A device according to claim 4, wherein the microcomputer, when a predetermined button is depressed, generates a control signal to switch an operation mode from a rotation mode in which a three-dimensional object is rotated on each axis to a translation mode in which the three-dimensional object is translated in the (+) or (-) direction of each axis, or vice versa.

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7. A device according to claim 6, wherein the microcomputer, according to the depression of the predetermined button, generates a control signal to change the axis on which the three-dimensional object is rotated or translated.

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8. A device according to claim 7, wherein the microcomputer, according to the time of the depression of the predetermined button, generates a control signal for unit translation or continuous translation.

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9. A device according to claim 8, wherein the microcomputer generates a control signal to translate the three-dimensional object along the +X axis when the buttons on a diagonal of the left-bottom direction, which corresponds to the direction of the X axis, are depressed from the button-part of a 3x3 array, and to translate the three-dimensional object along the -X axis when the buttons on a diagonal of the right-top direction are depressed.

10 10. A device according to claim 8, wherein the microcomputer generates a control signal to translate the three-dimensional object along the +Y axis when the buttons on a diagonal of the right-bottom direction, which corresponds to the direction of the Y axis, are depressed from the button-part of a 3x3 array, and to translate the three-dimensional object along the -Y axis when the buttons on a diagonal of the left-top direction are depressed.

11. A device according to claim 8, wherein the microcomputer generates a control signal to translate the three-dimensional object along the +Z axis when the buttons on a vertical line of upward direction, which corresponds to the direction of the Z axis, are depressed from the button-part of a 3x3 array, and to translate the three-dimensional object along the -Z axis when the buttons on a vertical line of downward direction are depressed.

12. A device according to claim 8, wherein the microcomputer generates a control signal to translate the three-dimensional object along the +HH axis when the buttons

on a horizontal line of the right direction, which corresponds to the direction of the HH axis, are depressed from the button-part of a 3x3 array, and to translate the three-dimensional object along the -HH axis when the buttons  
5 on a horizontal line of the left direction are depressed.

13. A device according to claim 8, wherein the microcomputer generates a control signal to translate the three-dimensional object forward to the front or backward  
10 according to the time and the frequency of the depression of the button which is at the position of the second column of the second row from the button-part of a 3x3 array.

14. A device according to claim 7, wherein the  
15 microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the X axis when the two different buttons on a diagonal, which proceeds to the left-top from the right-bottom, are depressed sequentially from the button-part of a 3x3 array, and  
20 to rotate the three-dimensional object in the direction of clockwise on the X axis when the two different buttons on the diagonal are depressed sequentially from the left-top to the right-bottom.

25 15. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the Y axis when the two different buttons on a diagonal, which proceeds to the left-bottom from the right-top, are depressed  
30 sequentially from the button-part of a 3x3 array, and

to rotate the three-dimensional object in the direction of clockwise on the Y axis when the two different buttons on the diagonal are depressed sequentially from the left-bottom to the right-top.

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16. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the Z axis when two different buttons on a horizontal line are depressed sequentially from the left to the right from the button-part of a 3x3 array, and

to rotate the three-dimensional object in the direction of clockwise on the Z axis when the two different buttons on the horizontal line are depressed sequentially from the right to the left.

17. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the HH axis when two different buttons on a vertical line are depressed sequentially from the top to the bottom from the button-part of a 3x3 array, and

to rotate the three-dimensional object in the direction of clockwise on the HH axis when the two different buttons on the horizontal line are depressed sequentially from the bottom to the top.

18. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise

on the first diagonal axis when the button at the position of the first column of the first row is depressed twice or the button at the third column of the third row is depressed and held for more than a predetermined time from the button-part of a 3x3 array, and

5       to rotate the three-dimensional object in the direction of clockwise on the first diagonal axis when the button at the first column of the first row is depressed and held for a predetermined time period or the button at the third column of the third row is depressed repeatedly.

19. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the second diagonal axis when the button at the position of the third column of the first row is depressed repeatedly or the button at the first column of the third row is depressed for more than a predetermined time period from the button-part of a 3x3 array, and

20       to rotate the three-dimensional object in the direction of clockwise on the second diagonal axis when the button at the third column of the first row is depressed and held for a predetermined time period or the button at the first column of the third row is depressed repeatedly.

25       20. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the third diagonal axis when the button which is at the position of the second column of the first row is depressed

repeatedly or the button at the second column of the third row is depressed for more than a predetermined time from the button-part of a 3x3 array, and

5 to rotate the three-dimensional object in the direction of clockwise on the third diagonal axis when the button at the second column of the first row is depressed and held for a predetermined time period or the button at the second column of the third row is depressed repeatedly.

10 21. A device according to claim 7, wherein the microcomputer generates a control signal to rotate the three-dimensional object in the direction of counterclockwise on the forth diagonal axis when the button which is at the position of the second column of the second row, the center,  
15 is depressed repeatedly from the button-part of a 3x3 array, and

to rotate the three-dimensional object in the direction of clockwise on the forth diagonal axis when the button at the second column of the second row is depressed for more than a  
20 predetermined time period.